



Fraunhofer Institute for Integrated Circuits IIS

Unlocking the Future of Fashion through Data & Collaboration

Standardizing Data for a Brighter Future: Uncover the roles and contributions of Gaia-X in shaping industry processes

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Dr. Tassilo Schuster

Basic facts about the presenter

Dr. Tassilo Schuster

Personal research interests:

- Exploring Sustainable Business Models and Business Model Innovation for a Circular Economy
- Investigating the Digital and Circular Transformation of Companies, with a Specific Focus on the Manufacturing Industry
- Analyzing the Impact of Data-Driven Services and Corresponding Platforms on Global Value Networks
- Exploring the Future of Work and Its Relationship with Digitalization with a Special Emphasis on the Global Mobility Perspective

Vita

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since 2022 Chief Scientist at the Fraunhofer Center for Applied Research on Supply Chain Services SCS - Group "Business Transformation"

2017 - 2019 Substitute Professor at the Ludwig-Maximilians-Universität München

2012 - 2017 Postdoctoral Researcher at the Friedrich-Alexander-University Erlangen-Nuremberg

2008 - 2012 Doctoral dissertation at the Friedrich-Alexander-University Erlangen-Nuremberg

2002 - 2007 Studies of Business Administration at the Friedrich-Alexander-University Erlangen-Nuremberg and at the Université de Montpellier



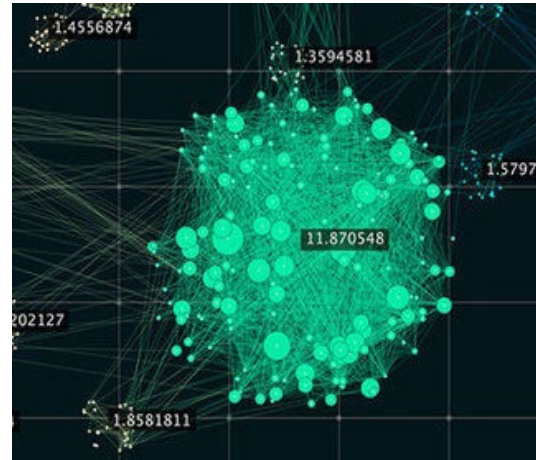
The Supply Chain Services Working Group is a division of IIS and generates "success and added value through data" for the manufacturing industry

Current research fields of the SCS working group at a glance



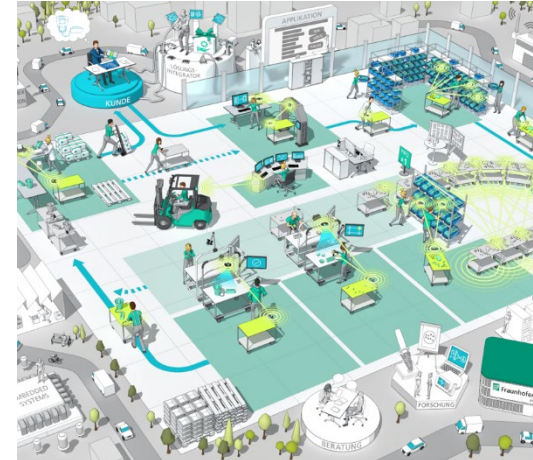
Smart Circular Economy

Closing previously linear supply chains into cycles using modern information and communication technology



Supply Chain Digital Twin

Use of data spaces (Gaia-X) and knowledge graphs as a basis for the realization of cross-company digital representations of supply chains



Supply Chain Analytics

Build a data analytics and machine learning orchestration platform as the basis for realizing supply chain services for resilience and sustainability.

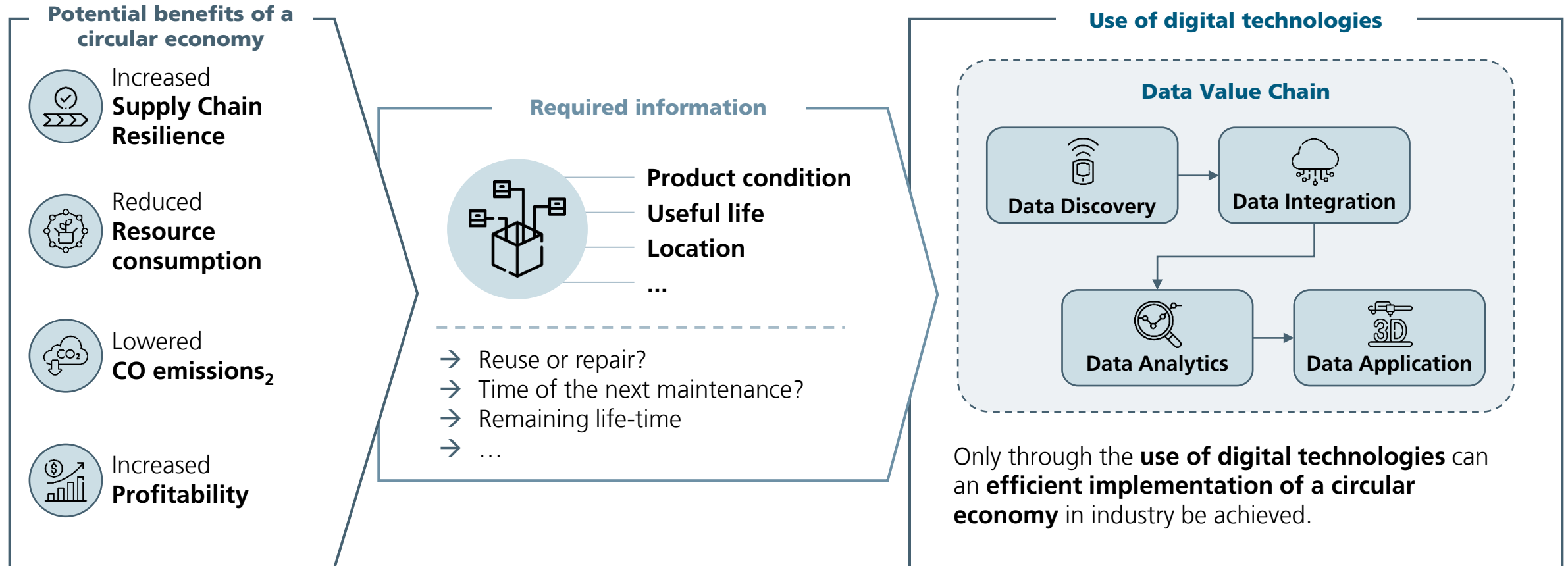


Resilient Supply Chains

Design and implementation of data- and platform-based SCM solutions as a basis for open, agile and sustainable resource configurations in business ecosystems

The establishment of a circular economy in companies is in many cases an information problem

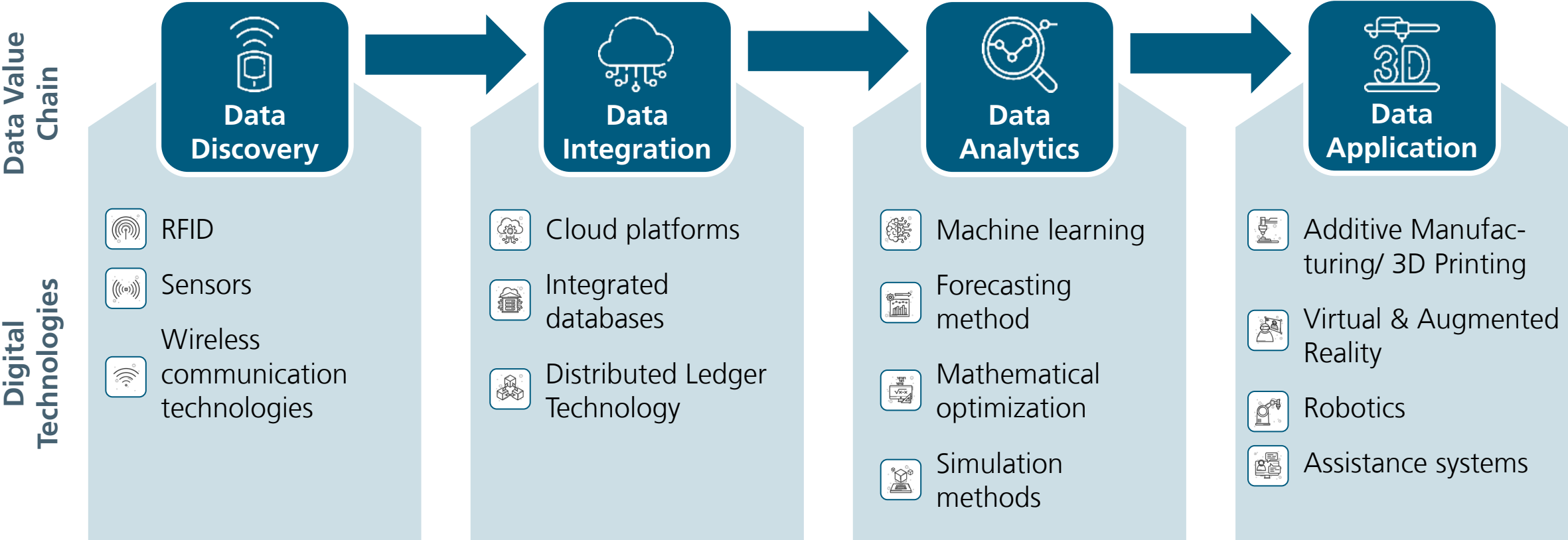
Digital technologies and data as enablers for a circular economy



Source: Fraunhofer IIS based on: Prosperkolleg according to Potting et al. 2017, in: Kirchherr et al. 2017.

Across the data value chain, a broad set of digital technologies can be applied to facilitate the circular transformation of companies

Digital Technologies within the Data Value Chain Context



We apply our expertise in smart circular economy to develop a service platform that allows companies to explore new services and business models

Development of a digital service platform

antrieb 4.0

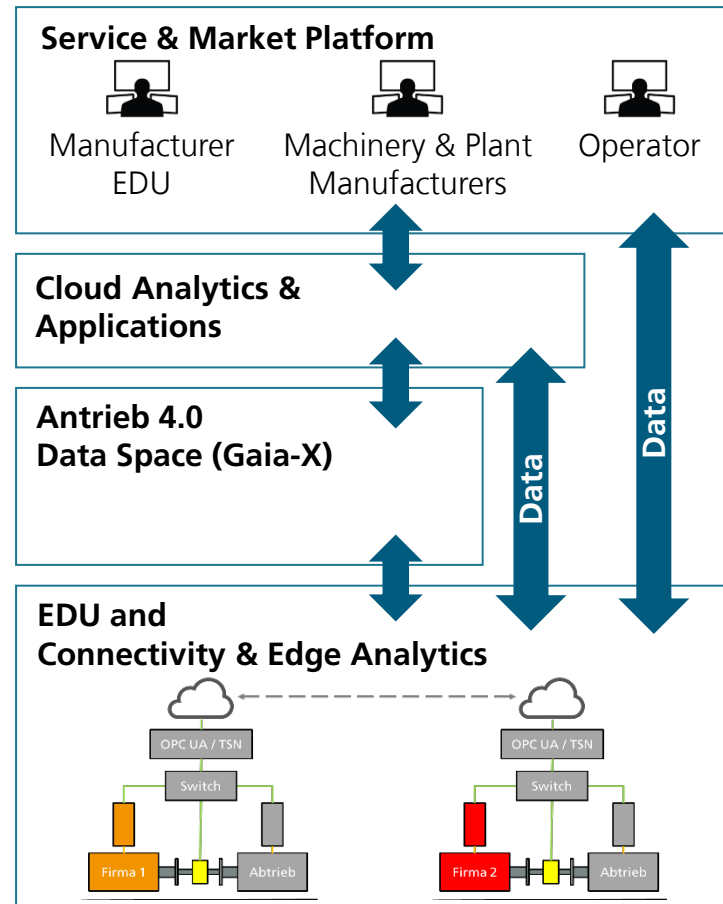
Impressum Datenschutzerklärung



Reallabor Antrieb 4.0 – Plug & Play-Systeme für den elektrischen Antrieb

Was in der Computertechnik schon längst zum normalen Alltag gehört, hat sich in der Welt der elektrischen Antriebe noch nicht durchgesetzt: klassische Plug & Play-Konzepte zur einfachen Inbetriebnahme und Optimierung von Daten. Das vom Bundesministerium für Wirtschaft und Klimaschutz (BMWK) geförderte Forschungsprojekt „Reallabor Antrieb 4.0“ setzt genau hier an und möchte in den nächsten drei Jahren die zentralen Grundlagen für die Entwicklung serviceorientierter Geschäftsmodelle im Bereich der digitalen Produktion und vernetzter Wertschöpfungsketten schaffen. Dafür sollen auch erforderliche standardisierte Technologien sowie allgemeingültige Ansätze für Schnittstellen und Infrastrukturen für eine erfolgreiche Umsetzung bestimmt werden. Denn gerade im Zeitalter der Industrie 4.0 ist die Nachfrage nach intelligenten, kostengünstigen und nachhaltigen Antriebslösungen enorm groß.

Die Konsortialpartner



Associated companies: 12

- ABB AG
- Baumüller Nuremberg GmbH
- Bosch Rexroth AG
- Danfoss GmbH
- ESR Pollmeier GmbH Servo drive technology
- KEBA Industrial Automation Germany GmbH
- Lenze SE
- Mitsubishi Electric Europe B.V.
- Pilz GmbH & Co KG
- Siemens AG
- Wittenstein SE
- ...

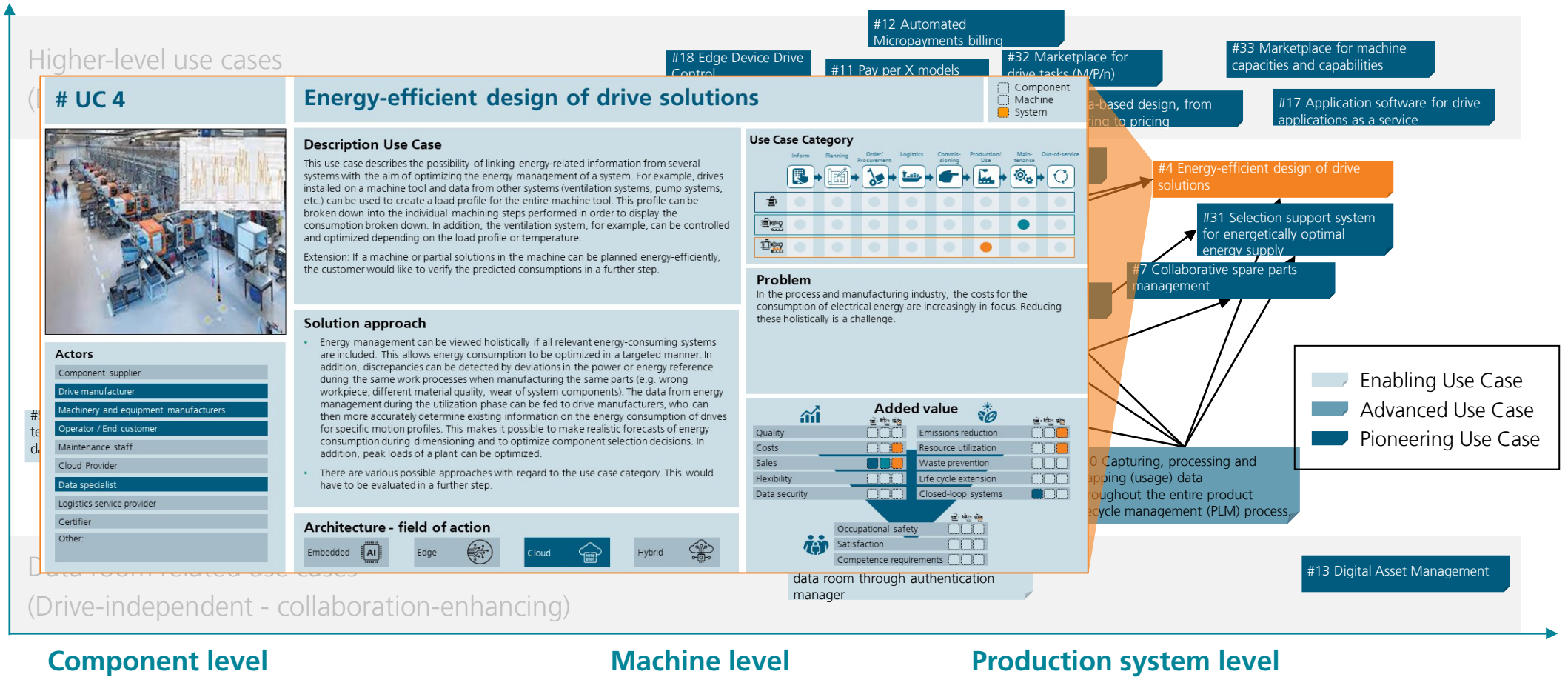


The identified use cases for the digital service platform offer a broad set of advantages for different ecosystem partners

Use Cases for the digital service platform

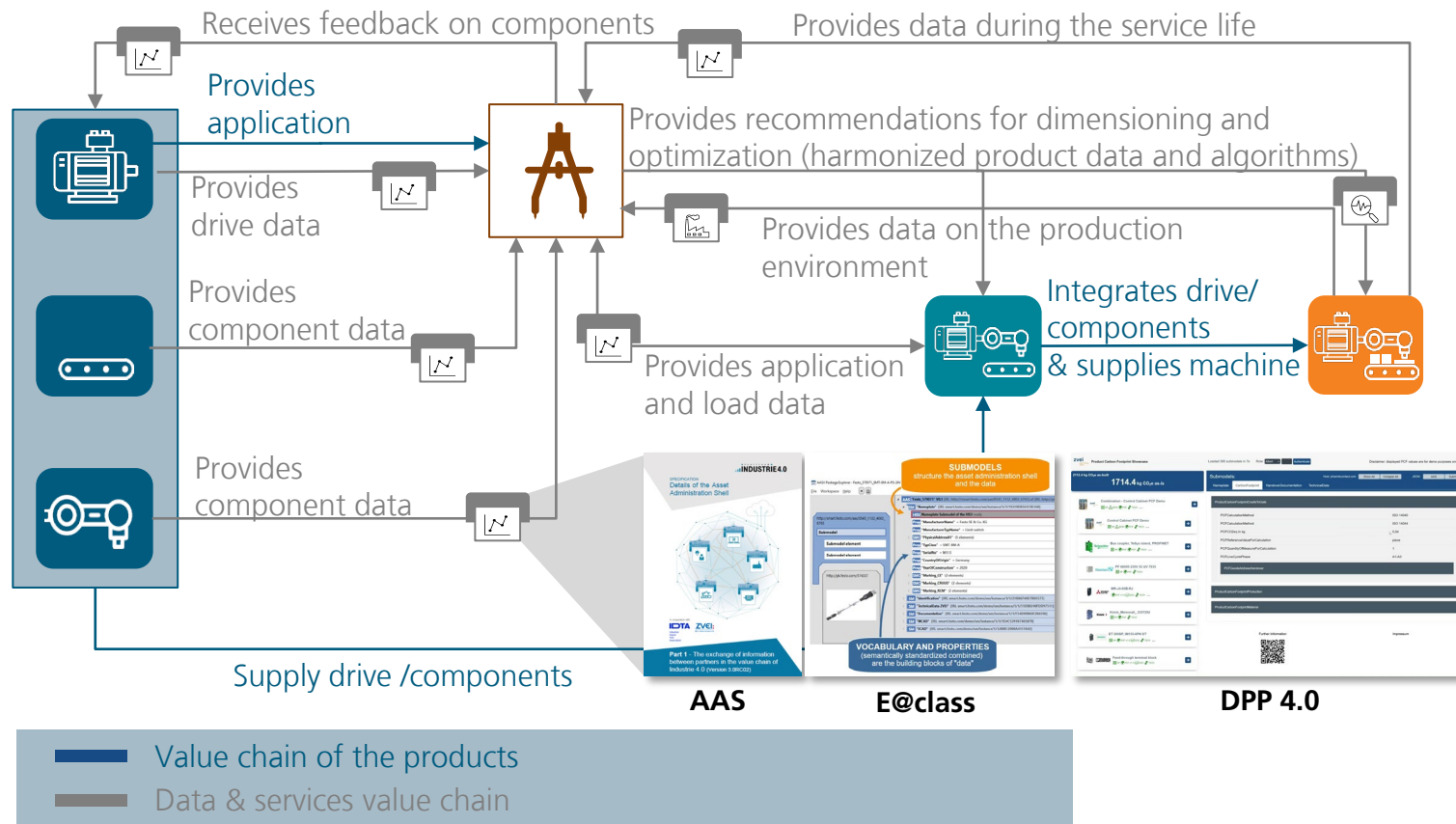
Applying Information

Generating Information



Applying the administration asset shell (AAS) and E@class Data Specification, we are able to offer standardized data exchange among ecosystem partners

Data flows enabled by the digital service platform of Use Case #4



Prior to energy-efficient drive system configuration

- Drive and component manufacturers provide technical data of their products in the application

Energy-efficient drive system configuration

- Movement and load profiles for future drive system are imported/created by machine manufacturer
- Machine manufacturer defines the requirements for the drive system
- Machine manufacturer determines general components

Post energy-efficient drive system configuration

- Application provides recommendations for most efficient components → Component selection
- Forecast energy demand of components & system for use phase
- Comparison of forecasted and actual energy demand
- Forecast CO₂ emissions during use phase
- Forecast of remaining component lifetime
- Calculation of utilization and energy-efficiency rate of drive system

The digital platform and shared data space facilitate partners in monetizing their data and offering value-added services

Examples of new business opportunities for different ecosystem partners



Monetization of own data: Provision of data on energy consumption and performance data for different load profiles.

Monetization of own data: Optimization recommendations through the provision of machine settings



Energy-related applications on service platform: provision of applications such as energy monitoring, peak load smoothing, etc.



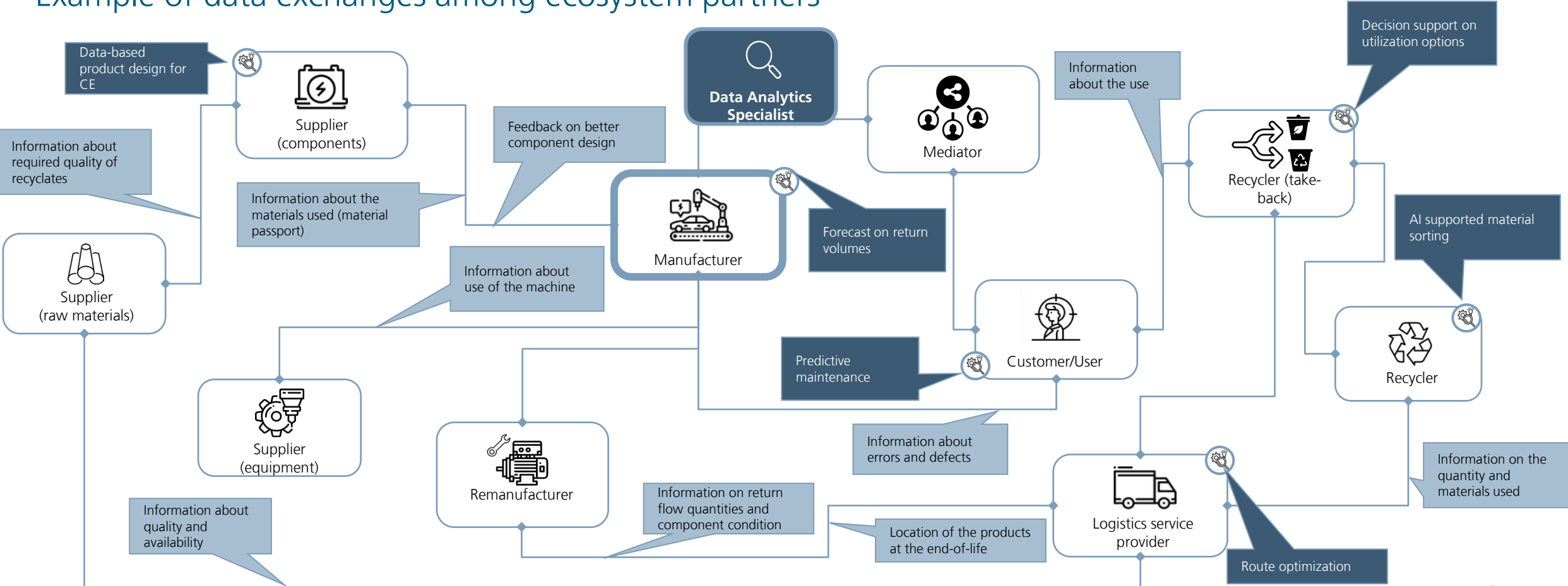
Data Analytics Services: Analysis of energy consumption during use, target/actual comparisons between design and operation, optimization recommendations



Data Analytics Services: Comparison of a system with systems of other companies (similar requirements and load profiles) to determine potential for improvement.

The digital service platform and the shared data space will create a unique ecosystem among partners, in which data can be trustfully exchanged

Example of data exchanges among ecosystem partners



Source: Fraunhofer IIS

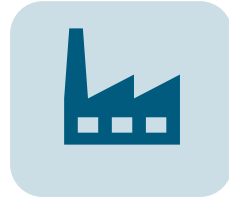
The exchange of data through a federated digital platform creates benefits for different actors also in the fashion industry

Benefits for different actors in the fashion industry



Raw material supplier

- Drives trust in sourcing methods through increased transparency
- Facilitates raw material recovery for remanufacturing
- Substantiates recycled material compositions in raw materials



Manufacturer

- Delivers post-sale data and insights from customers
- Facilitates warranty claims and recalls
- Prevents product privacy and counterfeiting
- Substantiates sustainability claims



Retailer

- Provides product identification
- Enables access to essential product information
- Ensures authenticity of product
- Supplies customers with trusted information



Customer

- Allows product comparison by sustainability attributes
- Delivers access to care, maintenance and usage instructions
- Provides services related to garment, like repair
- Locates recycling services

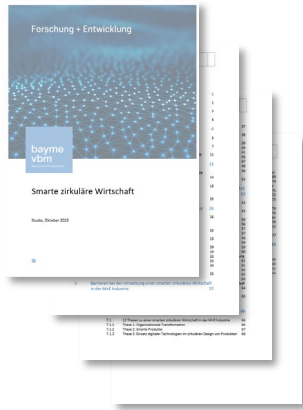


Recycler / Repairer

- Provides trusted information on repair
- Identifies preventative repair opportunities
- Enables automated sourcing of materials
- Delivers access to info for maintenance, repair or upgrading

The creation of a real circular economy will require a fundamental transformation process of entire industries

Theses for a visionary smart circular economy in the M+E industry



12 theses

- 1 Organizational transformation**
Comprehensive integration of circular principles and digital technologies in the strategy and business models
- 2 Smart products**
Products are smart, i.e. they are equipped with digital technologies and communicate with each other as well as with the real world
- 3 Use of digital technologies in the circular product design**
Consideration of digital technologies and data collected during the use phase of products in the design process.
- 4 Tracking & tracing of data over the entire product life cycle**
Digital exchange of product information between different actors in the ecosystem and storage in a digital product passport
- 5 Common data space**
Development of common agreements, rules and standards for a federated and open infrastructure for sovereign data exchange
- 6 Platforms for connecting ecosystem partners and matching supply and demand**
Virtual marketplaces for trading secondary materials as well as used and remanufactured components and products
- 7 New data-based services**
Leveraging the collection and delivery of data and information about the condition, availability, and location of smart products
- 8 Service-oriented business models (XaaS)**
Offering solutions instead of products by retaining ownership and risk
- 9 Reverse logistics processes as the key to a successful smart circular economy**
Use of digital technologies for information about the location, the current user and further status information and forecasts
- 10 New roles in the smart circular ecosystem**
Taking on key activities such as brokering EoL products, disassembly, remanufacturing, recycling, reverse logistics and more
- 11 AI decision support system for data-based selection over R-strategies**
Based on usage and lifecycle data, external characteristics, usage intensity, deployment location, expected remaining useful life, and more
- 12 Use of Green ICT**
Use of energy-saving information and communication technology

Thank you
for your time

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Contact



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